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THE MUSICAL TIMES,
And Singing Class Circular.
NOVEMBER 1st, 1862.

A DRAUGHT FOR THE PARTICULAR HISTORY OF PHONICS: OR, THE DOCTRINE OF SOUND AND HEARING.

From Lord Bacon's "Sylva Sylvarum."

(Continued from page 322.)

SECTION VIII.

OF THE PROPORTION OF TREBLE AND BASS TONES.

The just and measured proportion of the air struck, with regard to the baseness or trebleness of tones, is one of the greatest secrets in the contemplation of sounds; for it discovers the true coincidence of times into diapasons, which is the return of the same sound; and so of the concords and discords between the unison and the diapason. This may be discovered—1, in the proportion of the winding of strings: 2, in the proportion of the distance of frets; and 3, in the proportion of the concavities of pipes, &c., but more commodiously in the last.

But first try the winding of a string once about, as soon as it is brought to that extension as to give a tone, then twice about, thrice, &c., and mark the scale, or difference of the rise of the tone; whereby you will at once discover two effects, or the proportion of the sound, in respect to winding; and the proportion of the sound, in respect of the string, as it is more or less strained; but to measure this, the way will be to take the length in a right line of the string, upon any winding about of the peg.

As for the stops: take the number of frets; and, principally, the length of the line from the first stop of the string, to such a stop as shall produce a diapason to the former, upon the same string.

But, as we before observed, the thing will best appear in the bores of wind-instruments: let, therefore, six pipes be made alike, in length and all things else, only with a single, double, and so on to a sextuple bore, and mark what fall of tone every one gives. But in these three instances it must be diligently observed, what length of string, distance of stop, and concavity of instrument, gives what rise of sound: thus, in the last case, you must set down what increase of concavity goes to the making of a note higher, what of two notes, what of three, and so up to the diapason, for then the great secret of numbers and proportions will appear. Perhaps the makers of wind-instruments know this already, because they make them in sets; and likewise bell-founders, in adjusting the tune of their bells, so that inquiry may here save trial.

'Tis observed by one of the ancients, that an empty barrel struck with the finger, gives a diapason to the sound of the like barrel when full; but how that should be I do not well understand, because the striking of a barrel, full or empty, scarce gives any tone.

Some sensible difference is required in the proportion of creating a note, with regard to the sound itself, which is passive, and that it be not too near, but at a distance; for in a recorder, the three uppermost holes yield one tone, which is a note lower than the tone of the first three; and the like, no doubt, is required in the winding or stopping of strings.

SECTION IX.

OF EXTERNAL AND INTERNAL SOUNDS.

There is another difference of sounds, which we call external and internal. There is neither soft nor loud, bass nor treble; musical nor immusical; and though there can be no tone in an external sound, yet it may be both musical and immusical. The internal sound we mean, is rather an impulse or contrusion, than an elision or cutting of the air; so that the percussion of the one, with regard to the other, differs as a blow does from a cut. In speech, the whisper, whether loud or soft, is an internal; but speaking out, an external sound; whence we can never make a tone, nor sing in whisper, but in speech we may. So breathing, or blowing by the mouth, bellows, or wind, though loud, is an internal sound; but the blowing through a pipe, or concavity, is an external one. So likewise the greatest winds, if they have no coarctation, or blow not hollow, give an internal sound; but the whistling, or hollow wind, yields a singing, or external sound; the former being confined by some other body, and the latter confined by its own density; and therefore when the wind blows hollow, 'tis a sign of rain. So flame, as it moves within itself, or is blown by bellows, gives a murmur, or internal sound.

There is no hard body, but when struck against another hard body, will yield an external sound, greater or less; insomuch that, if the percussion be over-soft, it may induce a nullity of sound, but never an internal sound, as when one treads so softly as not to be heard. Where the air, whether confined or not confined, is the percutient against a hard body, it never gives an external sound, as in blowing strongly with bellows against a wall. Sounds, both external and internal, may be made as well by suction as by emission of the breath, as in whistling or breathing.

SECTION X.

OF THE ARTICULATION OF SOUNDS.

'Tis one of the greatest mysteries in sounds, that the whole sound is not only in the whole air, but the whole sound is also in every small part of the air; so that all the curious diversity of articulate sounds, as in the voice of a man or birds, will enter at a small chink, without confusion.

The unequal agitation of the winds, or the like, though it promotes the conveyance of sounds, yet does not confound their articulation within the distance they can be heard to, though it may cause them to be heard the less way.

Too great distance confounds the articulation of sounds; thus we may hear the sound of a preacher's voice when we cannot distinguish what he says. And one articulate sound will confound another, as when many speak at once.

In speaking under water, when the voice is reduced to an extreme exility, yet the articulate sounds, that is the words, are not confounded. I conceive that an extreme small, or an extreme great sound, cannot be articulate, but that articulation requires a mediocrity of sound, as the extreme small sounds confound the articulation by contracting, and the large one by dispersing: and though an articulate sound already created, will be contracted into a small compass and pass through a narrow chink, yet the first articulation requires a greater dimension.

It has been observed that in a room, or chapel, vaulted below and above, a preacher cannot be heard so well, as in the like places, not so vaulted. For in this case the subsequent words come on before the precedent ones vanish, and therefore the articulate sounds are more confused, though the gross of the sound be greater.

The motions of the tongue, lips, throat, palate, &c., which go to make the several alphabetical letters, relate to the inquiry of sounds. The Hebrews have been diligent herein, and determined which letters are labial, dental, guttural, &c. The Latins and Grecians have distinguished between semi-vowels and mutes; and in mutes tolerably well between mutæ tenües, mediæ and aspirate, though not with diligence. For they have little examined the particular percussions and motions that create those sounds; as that the letters, B, P, F, M, are not expressed, but with contracting or shutting the mouth; that the letters N and B cannot be pronounced together, without the letter N turning into M; as Hecatonba will become Hecatomba; that M and T cannot be pronounced together, but P will come between them; as Emtus is pronounced Emptus; and there are many of the like instances. So that whoever inquires to the full, will find there are fewer simple motions required to the making of the whole alphabet than there are letters.

The lungs are the most spungy part of the body, and therefore ablest to contract and dilate; and when they contract, they expel the air, which, passing through the aspera arteria, throat, and mouth, makes the voice; but articulation is not produced without the help of the tongue, the palate, and the rest of those called the organs of speech.

There is a similitude between the sound made by inanimate bodies, or animate bodies that have no articulate voice, and several letters of articulate voices; and men have commonly given such names to these sounds as allude to the articulate letters. Thus the trembling sound of water bears a resemblance to the letter L; the quenching of hot metals, in water, to the letter Z; the snarling of dogs, to the letter R; the voice of screech-owls, to the letters Sh; the voice of cats, to the diphthong Eu; the voice of cuckows, to the diphthong Ou; the sounds of strings, to the letters Ng. So that, for instance, to make an inanimate body pronounce a word, the motion of the instruments of the voice must be considered on the one side, and the like sounds made in inanimate bodies on the other, and what conformity causes the similitude of sounds.

SECTION XI.

THE DIRECTION OF SOUNDS.

Sounds move in a sphere—that is, every way; upwards, downwards, forwards and backwards, as appears in all instances. Sounds do not, like the rays of light, require to be conveyed to the sense in right lines, though they move strongest in a right line, because such a line is the shortest distance. Hence, a voice on one side of a wall is heard on the other, not because the sound passes through the wall, but archwise over it.

If a sound be stopped and repelled, it goes round on the other side, in an oblique line. Thus, if a bell be rung on the north side of a chamber, and the window of that chamber open to the south, a person within the chamber would think the sound came from the south; and the case is the same in a coach, &c.

Sounds, though they move in a sphere, yet are strongest, and go farthest in the front-line, from the first impulse of the air; and therefore, in preaching, the voice is better heard before the pulpit than behind it, or on the sides, though it stand open. So a piece of ordnance will be farther heard forward from the mouth of the piece, than behind or on the sides.

It may be suspected that sounds move better downwards than upwards. Pulpits are placed high above the people; and when the ancient generals harangued their armies, they had always a mount cast up for them to stand upon. But this may be imputed to the stops and obstacles which the voice meets with in speaking on a level. Yet there seems to be somewhat more in it, for perhaps spiritual species, both visible and audible, move better downwards than upwards. It is strange that to men standing upon the ground, others upon the top of St. Paul's, seem not only much less but cannot be known; whilst to those above the persons below seem not so little, and may be known; though all other things to them above seem somewhat contracted and better defined, or collected into figures. So knots in gardens show best from an upper window or terrace. But to make an exact trial, with regard to sound, let a man stand in a chamber not much above the ground, and speak out at the window through a trunk as softly as he can to one standing on the ground, the other laying his ear close to the trunk;

then let the person below speak in the same degree of softness, and let him in the chamber lay his ear to the trunk; and this may be a proper means to judge whether sounds descend or ascend the better.

SECTION XII.

THE DURATION OF SOUNDS, AND THE TIME THEY REQUIRE IN THEIR GENERATION OR PROPAGATION.

After sound is created, as it is in a moment, we find it continues some small time, melting by degrees. And here a great error has prevailed, in taking this to be a continuance of the first sound, whereas it is a renovation; for the body struck has a trepidation wrought in the minute parts, and so renews the percussion of the air. This is evident, because the melting sound of a bell, or string, ceases as soon as the bell or string is touched. And here are too trepidations to be distinguished; the one manifest and local, as of the bell when it is pensile; the other secret, and of the minute parts; yet the local greatly helps the secret one. So likewise in pipes and other wind-instruments, the sound lasts no longer than the breath blows. It is true that in organs there is a confused murmur for a small time after, but this is only while the bellows are falling.

It is certain that the report of ordnance, where many are fired together, will be carried above twenty miles by land, and much farther by water; but then it comes to the ear, not in the instant of shooting, but perhaps an hour or more after, which must needs be a continuance of the first sound, for there is no trepidation to renew it. And the touching of the ordnance would not extinguish the sound the sooner, so that in greater sounds the continuance is more than momentary.

To try exactly the time wherein sound is propagated, let a man stand in a steeple, with a taper, veiled, and let another man stand a mile off; then let the person in the steeple strike a bell, and at the same instant withdraw the veil or blind, that the other at a distance may measure the time between the light seen and the sound heard—for light is propagated instantaneously. This may be tried in far greater distances, allowing greater lights and sounds.

It is generally observed that light moves swifter than sound, for the flash of a musket is seen sooner than the report is heard. And in the hewing of wood, we may see, at some distance, the arm lifted up for a second stroke before we hear the sound of the first. And the greater the distance the greater is the anticipation; as in thunder afar off, when the lightning long precedes the crack.

Colours represented to the eye, neither fade nor melt by degrees, but appear still in the same strength; whilst sounds melt and vanish by little and little; for colours participate not of the motion of the air, as sounds do. And it is manifest that sound participates of some local motion of the air, because it perishes so suddenly; for in every division or impulse of the air, the air suddenly restores and re-unites itself, which water also does, though not so swiftly.

SECTION XIII.

THE PASSAGE AND INTERCEPTION OF SOUNDS.

In experiments of the passage, or resistance of sounds, care must be had not to mistake the passing along the sides of a body, for the passing through a body; and therefore the intercepting body should be very close, for sound will pass through a small chink. But when the sound is to pass through a hard or close body, as a wall, metal, water, &c., the body must be but thin and small, otherwise it utterly damps the sound; whence in the experiment of speaking under water, the voice must not be very deep within the water, for then the sound would not penetrate through.

It is certain that in the passage of sounds through hard bodies, the spirit or pneumatical part of the body itself co-operates, but much better when the sides of the hard body are struck than when the percussion is only internal, without touching the sides. Take, therefore, a hawk's bell, with the holes stopped up, and hang it, by a wire, within a glass bottle, close the mouth of the glass with wax, then shake the glass, and try whether the bell will give any sound, or how weak.

It is certain that a very wide arch descending sharp will quite extinguish sounds, so that the sound which would be heard over a wall cannot be heard over a church; nor the sound, audible at some distance from a wall, be heard close under the wall.

Soft and foraminous bodies will deaden sounds in their first creation, for the striking against cloth or fur makes little sound, but in its passage they admit it better than harder bodies; so curtains and hangings do not stop a sound much, but glass windows, if very close, will check it more than the like thickness of cloth.

It is worth inquiring, whether great sounds do not become more weak and exile, in passing through small chinks; for the subtleties of articulate sounds may perhaps pass then unconfused, but magnitude of sound not so well.

SECTION XIV.

OF THE MEDIUM OF SOUNDS.

The mediums of sounds are air, water, soft and porous bodies, and in some degree also hard ones; but all of them are dull and inapt, except the air. The thinner air does not convey sound so well as the denser. This appears from sounds in the night and evening, in moist weather and in southern winds; for thin air is better penetrated, whilst a thick air better preserves the sound from waste. But let farther trial be made by hollowing in mists and gentle showers; for dampness, perhaps, will somewhat deaden the sound.

How far flame may be a medium of sound, especially such as are created by air, and not betwixt hard bodies, may be tried by speaking where a bonfire is between; but then allowance must be made for some disturbance in the sound, caused by that of the flame itself.

Whether any other fluids, being used as mediums, propagate sound differently from water, may be easily tried, as by striking the bottom of a vessel, filled either with milk or oil, which, though more light, are more unequal bodies than water.

(*To be continued.*)

TO CORRESPONDENTS.

We cannot undertake to return offered contributions; the authors, therefore, will do well to retain copies.

We would request those who send us country newspapers, wishing us to read particular paragraphs, to mark the passage, by cutting a slip in the paper near it.

Colored Envelopes *are sent to all Subscribers whose payment in advance is exhausted. The paper will be discontinued where the Subscriber neglects to renew. We again remind those who are disappointed in getting back numbers, that only the music pages are stereotyped, and of the rest of the paper, only sufficient are printed to supply the current sale.*

Notices of concerts and other information supplied by our friends in the country, must be forwarded as early as possible after the occurrence, otherwise they cannot be inserted. Our correspondents must specifically denote the date of each concert, for without such date no notice can be taken of the performance. All communications must be authenticated by the proper name and address of the writer.

We do not recollect to have seen any treatise on the law of sub-harmonics, nor do we believe that the theory has been any further developed than it is in the letter addressed to the Musical Times *in Nov.,* 1852, *by Dr. Bexfield. That gentleman is now dead.*

J.—*The meaning of the term "verse" in an anthem, is that the music should be sung by one voice only to a part. An anthem written in four parts may be sung by any equal number of voices, unless there is an intimation to the contrary by the composer, or unless the effect would be manifestly injured.*

Brief Chronicle of the last Month.

Abingdon.—On Monday, Oct. 13, the members of the Musical Association held their first meeting for this season at the Council Chamber. Haydn's *Third Mass* was selected for the occasion, the solos being taken by Mrs. Davis, Miss M. Evans, Mr. Glanville, and Mr. Richardson. Miss Evans accompanied, and Mr. Shepherd conducted. The society has experienced a great loss in the departure of the Rev. S. Edger, who acted as conductor, and of Mrs. Edger, who sung the principal soprano parts. On the reverend gentleman's departure he was presented, by the members of the association, with a handsomely-bound edition of Beethoven's instrumental works, as a testimonial of appreciation of the valuable services rendered by himself and Mrs. Edger for nearly six years.

Armagh.—The friends of Mr. Allen, who is about to quit the Cathedral Choir, have determined upon making a collection for the purpose of presenting him with a testimonial, to show their respect and esteem for him, and as an acknowledgment of his excellence as a musician, a composer, and a teacher. The committee formed for this object includes the Dean of Armagh, the Rev. Mr. Strangways, and other gentlemen of high standing, with Mr. R. S. Bond as their hon. sec.

Arthur Street Chapel, Gray's-inn-road.—A selection of music was sung on the 7th ult. at this chapel. The vocalists were Mesdames Rutty, Pulsford, and Marshall; Messrs. Denvall, Clare, Hodgson, Cox, Travis, Flack, &c. There was also an efficient choir of nearly thirty voices, conducted by Mr. Dale. Harmonium, Mr. Snell; pianoforte, Messrs. Heins and Cox.

Bethnal Green.—On Tuesday, Oct. 7, the members of the St. Philip's Singing Class gave a concert in the New Schools, Club Row. The programme comprised selections from Mozart's *Twelfth Mass*, anthems, glees, madrigals, &c. Mr. J. Phillips conducted, and Mr. G. A. Sarvent presided at the harmonium.

Blind School, Regent's Park.—The examination and musical performance of the blind pupils took place on the 6th ult. The improvement of the scholars was considered satisfactory.

Bow.—A sacred concert was given in Salem Chapel, Bow Road, on the 22nd of September last, consisting of selections from Handel's *Israel in Egypt* (the choruses of which were given with great precision) and a miscellaneous selection. The principal singers were Miss Newson, Miss Gibbard, Miss Potter, and Mr. Lubbock. The chorus numbered nearly seventy voices. Mr. Gurson led the band; Miss Gurson and Mr. Lloyd presided at the organ; and Mr. Bridge conducted.

Bradford.—The choir of the Parish Church Sunday School gave their fourth annual concert on Thursday evening, Oct. 16th, in the School Room, Stott Hill. A few readings were interspersed in the programme, which were creditably given by Messrs. Darlow and Sincy. Mr. Sewell conducted; and Mr. Mitchell presided at the organ and pianoforte.

Chelmsford.—On Friday, the 10th of October, a very interesting entertainment was given by Mr. Barnes, consisting of the reading of Shakspeare's play of *Macbeth* by Mr. Arthur Young, and the performance of Locke's music to that play by an efficient choir. The performance took place at the Institute, and the arrangements were well carried out, and gave much satisfaction to the audience. The play was read very ably, and the effect of the music was much increased by all the singers being dressed in appropriate costumes.

Cheltenham.—The last of the promenade concerts for the season took place at the Pitville Spa Pump Room, on Friday, the 10th ult., and was well attended, being for the benefit of the manager. Major and Bretherton's band was considerably augmented for the occasion. The solo vocalists were Mr. Hunt and Mr. Mugford: pianoforte, Mr. Matthews.

Croydon.—Madame de Vaucheran gave a concert in the Public Hall, on the 13th of October. A very interesting programme was arranged for the occasion, and Madame de Vaucheran's performance on the pianoforte was much admired.

Heckmondwike.—The members of the Choral Society gave Haydn's *Creation* in the Freemasons' Hall, on Friday evening, Oct. 24. The solo parts were ably sustained by Mrs. Sunderland, Mr. Whitehead, of Huddersfield, and Mr. Hinchcliffe, of Halifax. The band was led by Mr. J. W. Bowling. Mr. W. Parker conducted the performance. The choruses were well given by the members of the society.

Howden.—On the 13th of October, a concert was given in the Town Hall, by Miss Maria Wilson, of Hull, and Messrs. Plowman, Hird, Hudson, Holmes, and Turner, of York.

Hull.—A concert was given on Monday evening, the 20th Oct., in the Sailors' Institute, by the St. James's Bell Ringers, assisted by Mrs. Lotherington, Mr. Walton, and Mr. Peach. The entertainment consisted of various performances on the bells, interspersed with pieces of vocal music. Mr. W. J. Petty conducted, and presided at the pianoforte.

London Mechanics' Institute.—A concert was given at the Mechanics' Institute, Southampton-buildings, Chancery-lane, on the 8th ult., by the Birkbeck choir, assisted by Miss Kane, Miss Hoare, Mrs. Ffrench; Messrs. Stedman, Shaw, Cruttwell, Page, Holmes, Slater, and Hemmings. The music, consisting of selections from the *Creation*, and various songs and glees, was well performed, and deserved much praise. Mr. Beuthin accompanied, and Mr. Mattacks conducted.

Manchester.—Mr. R. Andrews gave a concert on the 14th ult, in the Mechanics' Lecture Hall, in aid of the Relief Fund of the district. Dr. Bennett's *Ode* was given by a choral body of nearly eighty voices, with organ, by